

## Research Note

# Intensity of *Neobenedenia girellae* (Monogenea: Capsalidae) on the Halfmoon, *Medialuna californiensis* (Perciformes: Kyphosidae), Examined Using a New Method for Detection

INGO H. GAIDA AND PATRICK FROST

Department of Biology, University of California (UCLA), Los Angeles, California 90024-1606

**ABSTRACT:** The intensity and prevalence of infestation of *Neobenedenia girellae* (Hargis, 1955) Yamaguti, 1963, were examined in the halfmoon, *Medialuna californiensis* (Steindachner). The halfmoon is a new host for this parasite, and its presence on this fish near Santa Catalina Island, California, extends its known geographical distribution. Two methods of examination were compared, 1 of which was a far more effective way of detecting non-microscopic *N. girellae*. Our results suggest that female *M. californiensis* have a significantly higher intensity of infestation than males. There appears to be no relationship between adult host size and intensity of infestation.

**KEY WORDS:** Monogenea, Capsalidae, intensity, *Neobenedenia girellae*, Kyphosidae, *Medialuna californiensis*, prevalence, California.

The halfmoon, *Medialuna californiensis* (Steindachner), is a kyphosid fish common off southern California. It ranges from Vancouver Island to the Gulf of California, but is rare north of Point Conception, California (Eschmeyer et al., 1983). The halfmoon is often found in rocky areas and in association with kelp forests, and ranges in depth from the surface to 40 m (Eschmeyer et al., 1983). Little is known about the occurrence of helminth parasites, particularly monogeneans, in northeastern Pacific kyphosids (Hargis, 1955). Herein we report the first finding of a monogenean on the halfmoon.

Forty-one halfmoons were obtained by hook and line and gill net between 19 and 29 October 1988, from 3 locations off Santa Catalina Island, California: Big Fisherman Cove, Blue Cavern Cove, and off Bird Rock (all at approximately 33°27'N, 118°29'W). All specimens were transferred in buckets to the Catalina Marine Science Center where they were held in tanks (for up to 8 hr) until examined for monogeneans.

Each fish was killed by severing the spinal cord behind the head, and then measured and sexed. The skin, fins, buccal cavity, and opercular cavity were examined for monogeneans. Two different methods of examination were employed on the freshly killed fish. The first 24 fish obtained were

examined visually (without magnification), while the next 17 fish obtained were examined visually after the application of alcohol-formalin-acetic acid (AFA), a fixative listed by Cailliet et al. (1986). The AFA was applied via pipette onto the entire external surface of the fish. The AFA turned the monogeneans opaque, facilitating their discovery. All monogeneans were fixed in AFA for 24 hr and then transferred to 70% ethanol. Forty voucher specimens from 9 different hosts were deposited in the collection of the Harold W. Manter Laboratory, University of Nebraska State Museum (HWML 32711–32719). The external body surface of each fish was examined for any gross, physical damage caused by the parasites.

All monogeneans found were the same species, *Neobenedenia girellae* (Hargis, 1955) Yamaguti, 1963, according to criteria presented by Crane (1972). *Neobenedenia girellae* is a capsalid monogenean that parasitizes a variety of marine teleosts, including *Girella nigricans* (Ayres), *Leptocottus armatus* Girard, and *Semicossyphus pulcher* (Ayres) off La Jolla, California and *Myctoperca pardalis* (= *Mycteroperca rosacea* (Streets)) off Baja California (Yamaguti, 1963). The occurrence of *N. girellae* on *Medialuna californiensis* constitutes a new host and geographic record (69 km northern extension of range).

We compared the 2 methods of examination for parasites to determine whether they were significantly different in terms of number of parasites detected per fish. A Mann-Whitney *U*-test comparing the AFA and visual-only methods showed a highly significant difference between them ( $U_s = 336.5$ ,  $P < 0.001$ ). Figure 1 shows the number of fish having a given number of parasites for the 2 methods of examination. A mean intensity of 2.6 parasites per fish and a prevalence of 75% was found using the visual-only method, whereas a mean of 11.8 parasites per fish and a prevalence of 94% was found using the AFA method. These results indicate that the

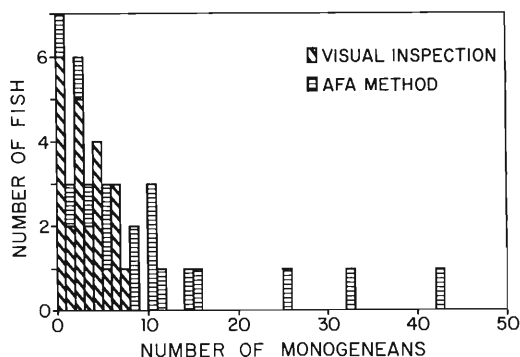


Figure 1. Comparison of numbers of *Neobenedenia girellae* found on *Medialuna californiensis* using the visual-only and AFA methods of examination.

AFA method is more effective in detecting *N. girellae* than is the visual-only method. The visual-only method is less efficient than the AFA method for 2 reasons. First, these parasites are naturally transparent, allowing individuals to blend in with the transparent mucus covering of the fish. Second, many of the parasites occurred underneath the scales of the fish, making them virtually impossible to detect without the aid of AFA. We suggest that future studies utilize the AFA method of detection for *N. girellae*. This method should be used in conjunction with a microscope in order to detect juvenile (100–200  $\mu\text{m}$ ) *N. girellae*. The AFA method may be useful for the detection of other species of monogeneans parasitic on fishes, but this warrants further study.

Because of the significant difference between the 2 methods, only the data from the AFA method were analyzed statistically. A Mann-Whitney *U*-test revealed that female fish had a significantly higher intensity of infestation than males ( $U_s = 50.5$ ,  $P < 0.025$ ). Prevalence was 92% for males and 100% for females. No significant correlation between size and intensity of infestation was found using Spearman's coefficient of rank correlation ( $df = 15$ ,  $P > 0.05$ ). Size related differences in intensity of infestation due to dietary and immunity changes have often been reported for parasite–host interactions (Noble et al., 1989). Future studies on the diet and immunity of the

halfmoon are therefore in order. A relationship does indeed exist between host sex and intensity of infestation. Females have a significantly greater intensity of infestation than do males. Differences may result from behavioral differences between males and females that make females more vulnerable, or females may be exuding a chemical attractant.

Visual examination of the external surface of the specimens revealed no apparent adverse effects due to the presence of *Neobenedenia girellae*. Nigrelli (1947) found that death occurred in many marine teleosts due to heavy infestations of *Neobenedenia melleni*. In this study, halfmoons that were heavily infested (up to 42 parasites) showed no obvious adverse effects.

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